

Claims

We claim:

1 1. A method of creating a model of a low pressure
2 compressor rotor for a gas turbine engine, comprising the
3 steps of:

4 creating a knowledge base of information having a
5 plurality of rules with respect to a corresponding
6 plurality of parameters of associated elements of the low
7 pressure compressor rotor, wherein the knowledge base
8 comprises at least one data value for each one of the
9 plurality of rules;

10 entering a desired data value for a selected one of
11 the plurality of parameters of an associated element of
12 the low pressure compressor rotor;

13 comparing the entered desired data value for the
14 selected one of the plurality of parameters with the
15 corresponding at least one data value in the knowledge
16 base for the corresponding one of the plurality of rules;
17 and

18 if the result of the step of comparing is such that
19 the entered desired data value for the selected one of
20 the plurality of parameters is determined to have a first
21 predetermined relationship with respect to the
22 corresponding at least one data value in the knowledge
23 base for the selected one of the plurality of rules, then
24 creating a geometric representation of the selected one
25 of the plurality of parameters of the associated element
26 of the low pressure compressor rotor.

1 2. The method of Claim 1, wherein the step of creating
2 a geometric representation of the selected one of the
3 plurality of parameters of the associated element of the
4 low pressure compressor rotor further comprises the step
5 of updating the model of the low pressure compressor
6 rotor with the selected one of the plurality of

7 parameters of the associated element of the low pressure
8 compressor rotor.

1 3. The method of Claim 1, wherein if the result of the
2 step of comparing is such that the entered desired data
3 value for the selected one of the plurality of parameters
4 is determined to have a second predetermined relationship
5 with respect to the corresponding at least one data value
6 in the knowledge base for the selected one of the
7 plurality of rules, then modifying the entered desired
8 data value for the selected one of the plurality of
9 parameters.

1 4. The method of claim 3, further comprising the steps
2 of:

3 comparing the modified data value for the selected
4 one of the plurality of parameters with the corresponding
5 at least one data value in the knowledge base for the
6 corresponding one of the plurality of rules; and
7 if the result of the step of comparing is such that
8 the modified data value for the selected one of the
9 plurality of parameters is determined to be of the first
10 predetermined relationship with respect to the
11 corresponding at least one data value in the knowledge
12 base for the corresponding one of the plurality of rules,
13 then creating a geometric representation of the selected
14 one of the plurality of parameters of the associated
15 element of the low pressure compressor rotor.

1 5. The method of Claim 1, further comprising the step
2 of storing the created knowledge base of information.

1 6. The method of Claim 1, further comprising the step
2 of displaying the created geometric representation of the
3 selected one of the plurality of parameters of the
4 associated element of the low pressure compressor rotor.

1 7. The method of Claim 1, wherein the associated
2 elements of the low pressure compressor rotor include a
3 plurality of axially spaced rings, the rings including
4 spacer means for connecting and establishing the spacing
5 between, successive rings.

1 8. The method of Claim 7, wherein the spacer means
2 between successive rings include a knife edge member,
3 successive rings are connected by welds in successive
4 spacer means, and wherein the knowledge base includes
5 rules for the placement of the welds relative to the
6 knife edge members.

1 9. The method of Claim 1, wherein the associated
2 elements of the low pressure compressor rotor include a
3 plurality of axially spaced rings, and wherein the
4 knowledge base includes rules for sizing the rings.

1 10. The method of Claim 1, further comprising the step
2 of analyzing the created geometric representation of the
3 selected one of the plurality of parameters of the
4 associated element of the low pressure compressor rotor.

1 11. The method of Claim 10, wherein the step of
2 analyzing the created geometric representation of the
3 selected one of the plurality of parameters of the
4 associated elements of the low pressure compressor rotor
5 further comprises the step of performing a durability
6 analysis on the created geometric representation of the
7 selected one of the plurality of parameters of the
8 associated elements of the low pressure compressor rotor.

1 12. The method of Claim 1, wherein the step of creating
2 the geometric representation of the selected one of the
3 plurality of parameters of the associated element of the

4 low pressure compressor rotor further comprises the step
5 of creating the model of the low pressure compressor
6 rotor.

1 13. The method of Claim 1, wherein the at least one data
2 value for some of the plurality of rules in the knowledge
3 base comprises a numerical value.

1 14. The method of Claim 1, wherein the step of entering
2 a desired data value for a selected one of the plurality
3 of parameters of an associated element of the low
4 pressure compressor rotor comprises the steps of:

5 making available at least one data value for each
6 one of the plurality of parameters of the associated
7 element of the low pressure compressor rotor; and
8 selecting a desired data value for the selected one
9 of the plurality of parameters of the associated element
10 of the low pressure compressor rotor from the at least
11 one data value made available for each one of the
12 plurality of parameters of the associated element of the
13 low pressure compressor rotor.

1 15. The method of Claim 14, wherein the step of making
2 available at least one data value for each one of the
3 plurality of parameters of the associated element of the
4 low pressure compressor rotor comprises the step of
5 providing a visual display containing a graphic depiction
6 of the at least one data value for each one of the
7 plurality of parameters of the associated element of the
8 low pressure compressor rotor.

1 16. The method of Claim 1, further comprising the step
2 of providing a file listing of a selected one or more of
3 the plurality of parameters of the associated elements of
4 the low pressure compressor rotor, wherein the file
5 listing includes at least one of the entered desired data

6 values for each one of the corresponding plurality of
7 parameters of the low pressure compressor rotor elements.

1 17. The method of Claim 16, wherein the step of
2 providing a file listing of a selected one or more of the
3 plurality of parameters of the associated elements of the
4 low pressure compressor rotor further comprises the step
5 of providing the file listing as an output from a
6 knowledge-based engineering system.

1 18. The method of Claim 17, wherein the step of
2 providing the file listing of a selected one or more of
3 the plurality of parameters of the associated elements of
4 the low pressure compressor rotor as an output from a
5 knowledge-based system further comprises the step of
6 providing the file listing as an input file to a computer
7 program for controlling parametric models of the design
8 of the tooling for the manufacture of the low pressure
9 compressor rotor.